AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of forming a cutting die including a die body and an integral blade extending outwardly from a surface of said die body, the method comprising the steps of:

cladding a blade material onto an area of said die body surface by heating said area with a laser, introducing said blade material into the heated area while heating said area, and building a blade of said blade material outwardly from said surface, wherein said blade material is compositionally different and of greater hardness than a base material forming said die body surface, and wherein said integral blade wholly comprises the material cladded by the laser; and

shaping the cladded blade.

2. (Previously Presented) A method as in claim 1 wherein said cladding step includes:

heating said area of said die body surface; and

introducing said blade material into the heated area while heating said area and building said blade of said blade material outwardly from said surface in a single pass of said laser.

3. (Previously Presented) A method as in claim 1 wherein the die body surface is cylindrical and including heating said area with said laser and introducing said blade material into the heated area while heating said area to completely build said blade on said cylindrical die body surface.

4. (Previously Presented) A method as in claim 1 including introducing cladding powder comprising a carbide into the heated area while heating said area for building said blade.

5. (Previously Presented) A method as in claim 1 wherein said shaping step includes shaping said blade by electrical discharge machining.

6. (Previously Presented) A method as in claim 1 wherein said shaping step includes shaping said blade by milling.

7. (Previously Presented) A method as in claim 1 wherein said shaping step includes shaping said blade by grinding.

8. (Original) A method as in claim 1 including the further step of heat treating said blade.

9. (Original) A method as in claim 1 including the further step of cryogenic treating said blade.

10. (Previously Presented) A method as in claim 1 wherein said cladding step includes:

scanning a laser beam along said die body surface comprising a low grade material of less than about 60 Rockwell C hardness, in a path corresponding to a desired blade pattern;

melting said die surface along said path; and

introducing a carbide-containing high grade material of at least about 60 Rockwell C hardness into said path while heating said path to build up a die blade in said pattern.

11. (Original) A method as in claim 10 including heat treating said die blade after said shaping to harden said die blade.

12. (Previously Presented) A method as in claim 1 wherein said introducing step includes introducing cladding powder selected from the group consisting of D2 steel, CMP10V steel, CMP15V steel and a nickel based superalloy with 30-40% volume fraction tungsten carbide.

13. (Previously Presented) A process for producing a cutting die having a metal base which carries a sharpened ridge extending along a predetermined path thereon, said ridge being of a composition distinct from said base, comprising the steps of;

a) moving a laser beam along said path to heat the metal base and simultaneously supplying powdered metal having a composition distinct from said base to said predetermined path via a tube moving concurrently with said laser beam so that said laser beam melts a thin layer of the metal base along said path and also melts the metal powder being delivered to the base and thus forms a band of fused metal powder along said path,

b) repeating steps a) so as to heat and melt a thin layer of the previously deposited metal along with additional metal powder to form an additional layer metallurgically bonded to the first layer, and

c) repeating step b) to produce multiple layers until a ridge of metal is formed along said path, said ridge having a substantially uniform height and width, and

d) sharpening the ridge so formed to suit it for use in cutting.

14. (Previously Presented) A process according to claim 13, wherein the metal base is cylindrical, the process including rotating the base to provide one component of relative motion between said base and said laser beam.

15. (Previously Presented) A process according to claim 13, wherein after said sharpening step, said ridge is heat treated using heat from said laser beam.

16. (Previously Presented) A process for producing a cutting die having a metal base which carries a sharpened ridge extending along a predetermined path thereon, said ridge being of a composition distinct from said base, comprising the steps of;

a) moving a laser beam along said path to heat the metal base and simultaneously supplying powdered metal having a composition distinct from said base to said predetermined path via a tube moving concurrently

with said laser beam so that said laser beam melts a thin layer of the metal base along said path and also melts the metal powder being delivered to the base and thus forms a band of fused metal powder along said path,

b) repeating steps a) so as to heat and melt a thin layer of the previously deposited metal along with additional metal powder to form an additional layer metallurgically bonded to the first layer, and

c) repeating step b) to produce multiple layers until a ridge of metal is formed along said path, and

d) sharpening the ridge so formed to suit it for use in cutting.

17. Cancel

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20. (Currently Amended) A method of forming a cutting die including a die body and an integral blade extending outwardly from a surface of said die body, the method comprising the steps of:

cladding a blade material onto an area of said die body surface by heating said area with a laser, and by depositing said blade material into the heated area while heating said area in multiple successive layers to form a blade of near net shape extending outwardly from said surface, wherein said blade material is compositionally different and of greater hardness than a base material forming said die body surface, wherein said integral blade wholly comprises the material cladded by the laser, and wherein said blade has a hardness equivalent to the final desired hardness of said blade; and

after said cladding step, shaping the cladded blade.

21. (Currently Amended) A method of forming a cutting die comprising the steps of:

depositing a carbide-containing blade material in multiple successive layers onto a cylindrical die surface by laser cladding with a material feeder coaxial with a laser beam to form a cladded blade of near net shape extending outwardly from and integral with said surface, wherein said blade material is compositionally different and of greater hardness than a base material forming said die surface, and wherein said cladded blade wholly comprises the material cladded by the laser; and

after said depositing step, shaping the cladded blade.

22. (Currently Amended) A method of forming a cutting die comprising the steps of:

heating an area of a cylindrical die surface in a path corresponding to a desired blade pattern including intersecting blades;

depositing a layer of blade material into said path while heating said area by laser cladding, wherein said blade material is compositionally different and of greater hardness than a base material forming said die surface;

repeating the step of depositing blade material onto a preceding layer of blade material until a blade of near net shape and desired thickness is formed extending outwardly from and integral with said surface in said pattern wherein said blade wholly comprises the material cladded by the laser; and

after said blade of desired thickness is formed, shaping the blade.

24. (Previously Presented) A method as in claim 22 including heating said area with said laser and introducing a carbide-containing blade material into the heated area while heating said area and building a blade having a hardness equivalent to the final desired hardness of said blade.

25. (Previously Presented) A method as in claim 22 including a further step of heat treating said blade after said shaping.

26. (Previously Presented) A method as in claim 22 including a further step of cryogenic treating said blade after said shaping.

27. (Previously Presented) A method as in claim 22 wherein said depositing steps include:

scanning a laser beam along said die surface comprising a low grade material of less than 60 Rockwell C hardness, in the path corresponding to the desired blade pattern;

melting said die surface along said path; and

introducing a carbide containing high grade material of at least 60 Rockwell C hardness into said path while heating said path and repeating the scanning along said path to build up a die blade in said pattern.

29. (Previously Presented) The method as in claim 1 wherein building said blade is in a pattern including intersecting portions.

30. (Previously Presented) The method as in claim 1 wherein said introducing step includes feeding said blade material by a feeder coaxial with a beam of said laser to heat said blade material while heating said area.

31. (Previously Presented) The method as in claim 1 wherein said die body is cylindrical, the method including rotating said die body to provide one component of relative motion between said die body and said laser.

32. (New) A method of forming a cutting die including a die body and an integral blade extending outwardly from a surface of said die body, the method comprising the steps of:

cladding a blade material onto an area of said die body surface by heating said area with a laser, introducing said blade material into the heated area while heating said area, and building a blade of said blade material in a near-net shape outwardly from said surface, wherein said blade material is compositionally different and of greater hardness than a base material forming said die body surface, and wherein said integral blade wholly comprises the material cladded by the laser; and

shaping the cladded blade.